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ABSTRACT

To assist the Division of Vocational Education (DVE) of the Florida State Department of Education, the author conducted a cost analysis of state-level models for acquiring competency-based instructional materials in vocational education. Two DVE-developed models of materials acquisition were examined: a centralized, single-option model in which the DVE developed its own materials, and a multioption model called VIMAS (Vocational Instructional Materials Acquisition System) that allowed purchase, free acquisition, adaptation, or development of materials. The average acquisition costs of five DVE projects using the single-option development model were compared with the average costs of 12 projects using the multioption model. Data were gathered on total acquisition costs, cost by acquisition option, costs of materials development and production, personnel costs, overhead, and costs to the original developers of materials. Data analysis with controls for inflation indicates that the VIMAS multioption model is less expensive than the single-option development model. Definitions of the cost categories used are appended. (RW)

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A Cost Analysis of a State-Level, Multi-Option Procedure for the Acquisition of Competency-Based Instructional Materials

Romeo M. Massey

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Presented at the Annual Meeting of the

American Educational Research Association

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ABSTRACT

Single-option (development) and multi-option (purchase, acquire free, adapt, develop) models for acquiring competency-based instructional materials are described. Costs for five development projects are compared with costs of 12 multi-option projects in: (1) total costs; (2) cost by acquisition option; (3) process and product costs; (4) functional costs; (5) costs to original developers of purchased, free, and adapted materials.

The Division of Vocational Education, Florida State Department of Education, believes that the multi-option procedures utilized in the Vocational Instructional Materials Acquisition System (VIMAS) are more appropriate for its needs than using just the development option.

ACKNOWLEDGEMENTS

The Vocational Instructional Materials Acquisition System (VIMAS) procedures described in this paper were developed and revised over a period of five years, using the experience gleaned from fifty-two projects. I would like to acknowledge the substantial contributions to the development and refinement of VIMAS by my colleagues Betty B. Bogusch, Ora M. Kromhout, Hyoja Lee, Nancy S. Mengel, and Marvin D. Patterson. I would also like to acknowledge the contributions made to VIMAS by John Crittenden, our liaison with the Division of Vocational Education and all-around problem solver and Robert Lathrop, Director of The Center for Studies in Vocational Education, both of whom helped conceptualize the system and gave us the strong support which made it possible to put the idea into practice.

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A Cost Analysis of a State-Level, Multi-Option Procedure for the Acquisition of Competency-Based Instructional Materials

Romeo M. Massey, Florida State University

I. INTRODUCTION

Public education agencies, whether they operate on the local, state, or national level, have a common, overriding problem; the demand to provide services often far exceeds the meager resources they have to meet those "needs." Several years ago, the Division of Vocational Education (DVE), Florida Department of Education, recognized the gap between the need for instructional materials in the more than three hundred vocational programs offered in Florida (such as Carpentry, Farm Management, Fashion Design, etc.) and its resource for assisting local agencies acquire good competency-based materials for each of these programs.

Prior to 1974, DVE produced curricular (teacher) and instructional (student) materials by sponsoring summer workshops, typically led by a vocational teacher educator and attended by fifteen or twenty teachers. There were several problems with this single-option (local development) acquisition strategy. No statewide need assessment was conducted to determine if the programs selected were the highest priority programs. In most cases, development was undertaken without knowing if similar materials already existed. The quality of the materials varied widely, and often the teacher-produced materials were so loaded with copyrighted materials as to make it legally impractical to use them. These problems convinced DVE to look for a model which would combine the subject matter expertise of local vocational educators and instructional desingers and eliminate some of the most obvious technical problems.

The DVE alternative, funded at Florida State University beginning in 1974, was called the Career Educational Curriculum Laboratory (later the Career Education Center). It employed systematic procedures of instructional design, development, and

validation to produce competency-based instructional materials for designated statewide target populations. All the necessary skills to complete five major development projects were centralized in this one large operation. Generally regarded as equal in quality to any instructional materials developed by public or private agencies (Crittenden & Massey, 1978) the centralized systems approach eliminated many of the technical deficiences found in materials resulting from local development efforts.

Yet, the fact that this acquisition option still required systematic, step-by-step development meant that each large-scale project was slow and time consuming. The average time spent on these five development projects, from inception to the reproduction of the products, was just under two years. The range went from seven months for the shortest, simplist project, to 38 months for the longest.

Centralized, single-option development was expensive as well. The average cost of the five major development projects (see Table 1) adjusted for inflation to 1979 levels was $251,390, with cost ranging from $126,971 for the least expensive, to $445,310 for the most expensive. These costs did not include the expenditure incurred in the development of catalogs of student competencies, which had been previously developed in Florida. Because of the costs involved, DVE was able to support only four of these large-scale development projects at one time.

It soon became obvious to the Vocational Division that, regardless of the excellent quality of the projects, this single-option, centralized development approach for acquiring competency-based instructional materials was too slow and expensive to meet the needs of more than 300 vocational programs.

TABLE I
Summary of estimated costs for Five Division of Vocational Education Single-Option Centralized Development Projects, With or Without Adjustment for Inflation

	(1) Design, Development, Validation Costs (Unadjusted)	(2) Information Searches Editing, Art/ Graphic Costs (Unadjusted)	(3) Additional Costs (Unadjusted)	(4) Reproduction Costs (Unadjusted)	(5) Total Cost (Unadjusted)	(6) Percent Of Inflation Adjustment Used To Approximate 1979 Dollars (e)	(7) Total Inflation Adjusted Cost To Equal 1979 Dollars
Project Pro-CESS	21,070(a)	8,849(b)	13,081(c)	62,000(d)	105,000	53.1	160,755
Project GROW	26,833(a)	19,167(b)	19,714(c)	24,400(d)	90,114	40.9	126,971
FL./V-TECS Inservice Project	36,665(a)	16,667(b)	24,999(c)	13,108(d)	91,439	40.9	128,838
Nursery Operations Project	86,333(a)	46,666(b)	63,428(c)	119,620(d)	316,047	40.9	445,310
Employability Skills Project	90,999(a)	49,166(b)	66,857(c)	73,374(d)	280,396	40.9	395,078
AVERAGE COST	52,380	28,103	37,616	58,500	176,599	—	251,390

(a) Estimates were first made on the person-months devoted to this activity. If exact amounts were not available for salaries, the dollar amounts in column 1 were arrived at by using an average yearly salary of $14,000, or a monthly figure of $1,166.66, and multiplying that by the number of person-months.

(b) Estimates were first made on the person-months devoted to this activity. If exact salay amounts were not available , the dollar amounts in column 2 were calculated by using an average yearly salary of $10,000, or a monthly figure of $833.33 and multiplying that by the number of person-months. The estimate of person-months spent on editing, art/graphics, information services is a gross estimate, but a conservative one.

(c) Additional project costs (column 3) include travel, equipment rental, materials, supplies, etc. These amounted, on the average, to approximately 30% of project costs (excluding reproduction) and was estimated on that basis.

(d) In column 4, the cost of "reproduction" includes all costs for final illustration, typesetting, paste-up, and proofing. These are additional costs over and above those included in column 2.

(e) See Attachment-A for Consumer Price Index inflation rates used in adjustments.

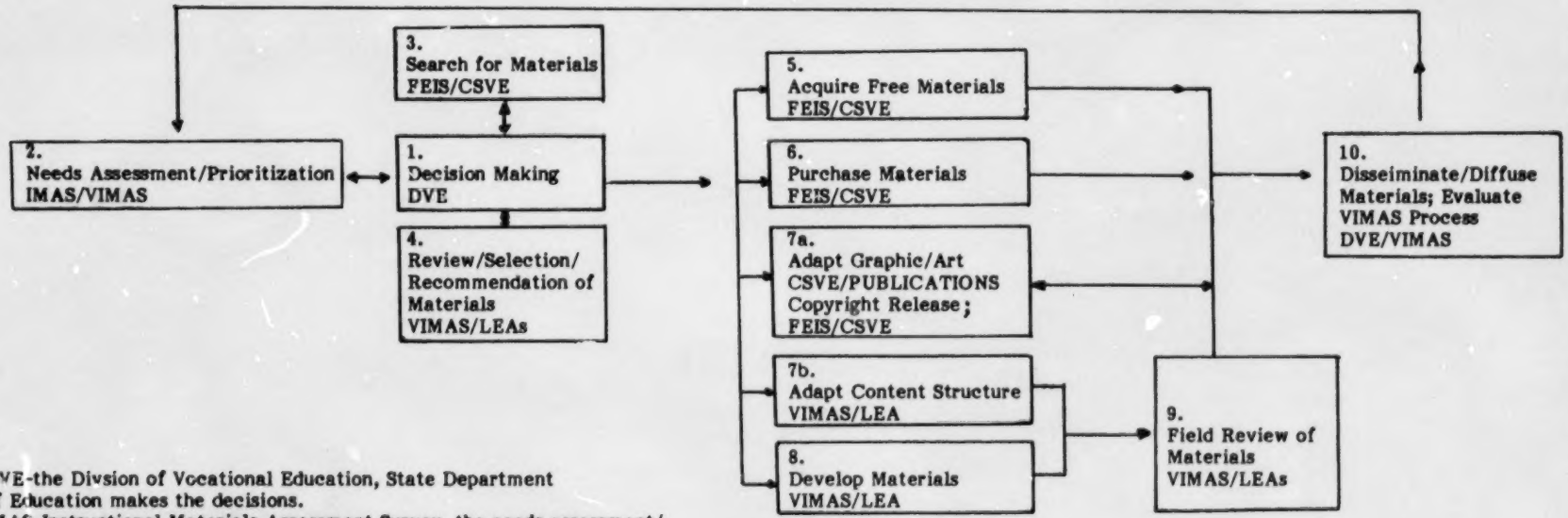
II. THE VIMAS MULTI-OPTION STRATEGY

In 1976, DVE decided on an alternative to the centralized single-option (development) approach for the acquisition of curricular and instructional materials. Again turning to Florida State University (in the renamed Center for Studies in Vocational Education - CSVE) it funded the Vocational Instructional Materials Acquisition System (VIMAS - see generalized project model, Figure 1). Organized around expanded existing components and new components, the VIMAS system had two major goals:

1. VIMAS was to insure the acquisition of high quality, competency-based curricular and instructional materials;
2. and, it was to reduce the time and money involved in acquiring such materials, using the five previous development projects as a basis for comparison.

One strategy of the VIMAS system was to make the allocation of scarce resources more efficient, if not reduce the actual amount of money involved, by initiating a state-level needs assessment and prioritization procedure which would allow DVE administrators to put funds where they would be used to the greatest advantage (Kromhout, 1978). Called the Instructional Materials Assessment Survey, this component of VIMAS has involved approximately 2,204 vocational teachers and supervisors in informing the DVE decision makers of the teachers' needs for competency-based instructional materials. An additional 153 vocational education administrators, program developers, and university teacher educators have assisted DVE by first generating and then weighting the importance factors which are used to prioritize the 300 programs. The needs information from the teachers is combined with the importance data from the program administrators into a "priority index" which DVE uses to establish priority programs for the acquisition of instructional materials.

FIGURE I
The Vocational Instructional Materials Acquisition System (VIMAS):
By Function and Organizational Affiliation of System Component



Legend

1. DVE-the Divsion of Vocational Education, State Department of Education makes the decisions.
2. IMAS-Instructional Materials Assessment Survey, the needs assessment/ prioritization component of VIMAS.
3. FEIS-Florida Educators' Information Service, located in the Center for Studies in Vocational Education, searches for exisiting materials.
4. LEAs-Local Education Agencies (school districts, voc-tec centers, colleges, universities) are contracted by DVE, with the assistance of the VIMAS staff to review, select, and recommend options for acquisition.
5. FEIS handles the acquisition of free materials.
6. FEIS handles the purchase of materials.
7a. CSVE Publications staff prepares materials for reproduction; FEIS handles the copyright release.
7b. Local education agencies are contracted, with help from VIMAS staff, to develop materials.
8. Local education agencies are contracted by DVE, with help from VIMAS staff, to develop materials.
9. Local education agencies participate in field review of materials.
10. The materials are disseminated/diffused by DVE staff, who work with VIMAS to evaluate entire system.

A second VIMAS strategy for saving time and money was the utilization of the Florida Educators' Information Service (FEIS) to conduct local, state, and national computerized and manual searches for existing curricular and instructional materials. The assumption was made that sufficient quantities of materials existed which had not been identified and which could be acquired through copyright release and purchase. It was assumed that this would result in savings which would justify the considerable amount of resources which would have to be expended for these types of searches.

A third VIMAS strategy was based on the assumption that professional instructional designers and local vocational teachers and supervisors could combine their special talents to work more efficiently than had been the case in either of the two previous models. The instructional designers would fashion standardized procedures and provide technical assistance to teachers and local supervisors to guarantee DVE that the resulting products would be free of the technical problems which had limited the utility of past products and would meet certain DVE-specified competency-based criteria (Kromhout & Massey, 1980). Local vocational educators, contracted by DVE, with the assistance of VIMAS Project Managers, would use their considerable subject matter expertise and VIMAS procedures to review existing curricular and instructional materials and make several types of recommendations to the Vocational Division (Massey & Kromhout, 1981).

The multi-options which can be recommended by the teacher committees fall into four categories:

1. They can recommend that multiple copies of materials which are available free of charge should be acquired and distributed to the statewide target populations.
2. Committee members can recommend that multiple copies of materials which are for sale be purchased and given to teachers.

3. Committee recommendations can include adaptation and reproduction of existing materials. Adaptations might include modifying the graphic/art design to meet equity guidelines, reformatting the materials to facilitate their use, and/or adapting the content or structure of the materials to meet the needs of Florida's vocational students and teachers. In the latter case, local teachers and supervisors, with assistance of the VIMAS instructional designers, would adapt the materials to meet DVE's accepted criteria or needs.
4. Only in the rare instance, where no existing materials are identified which can be acquired through some other means, would the committee recommend strategy, and then in the limited context of developing only what is absolutely necessary.

Once DVE has decided which of the recommended options it wants to use in acquiring multiple copies of the materials, its decisions are coordinated at the state level by appropriate personnel working in the Center for Studies in Vocational Education. Since most of the recommendations approved involve multiple products in each of the approved options, and as the materials are destined for statewide target populations, the final acquisition has been found to be most efficient when centralized at CSVE. The Florida Educators' Information Service staff handles the ordering of free and purchased materials, as well as contacting owners for copyright clearance to reproduce materials, while the CSVE Publications Division staff coordinate the reproduction. The VIMAS Project Managers oversee the entire complex acquisition.

III. COSTS OF VIMAS PROJECTS

No cost-benefit analyses were planned for either the local development, centralized single-option development, or VIMAS multiple-option acquisition models. After some preliminary investigation of the stringent requirements necessary for conducting a valid cost-benefit study of VIMAS, it was decided that a more modest comparison of costs between the first centralized projects and selected VIMAS projects would be adequate to answer questions as to whether VIMAS was a less expensive method for acquiring competency-based materials.

Twelve projects which adhered to the VIMAS model most closely and had complete cost data available were selected (see Table 2) four from FY-1978 (7/1/77 - 6/30/78) and eight from FY-1979 (7/1/78 - 6/30/79). The Cost Summary Sheet and the definitions of cost categories used for compiling the cost data are found in Attachment B. The costs for the 1978 projects were adjusted for inflation by adding 13.3 percent to make them comparable to 1979 projects. The inflation-adjusted average cost for all twelve VIMAS projects was $45,147, with the 1978 projects costing an average of $49,128 and the 1979 projects an average of $43,156. Although it appears savings were made in the second year in certain categories of expenditures, because of the differences in the products and numbers of products acquired in each project, it isn't possible to say that real costs were reduced in the second year.

The average cost for the five previously discussed centralized development projects (see Table 1) after adjusting for inflation was $251,390. The average cost for the smaller three centralized development projects was $138,855 and for the larger two was $420,194. The average cost for the twelve VIMAS projects ($45,147) was 18 percent of the average cost for the five centralized projects.

TABLE 2

Project Costs for Twelve Selected VIMAS Projects
Adjusted for Inflation

Project Title/Fiscal Year	Unadjusted Cost	Inflation Adjusted Cost	Average Cost/ Fiscal Year(s)
FY-1978			
Child Guidance & Care Services	28,895	32,738(a)	
Indust. Materials & Processes	55,688	63,095(a)	
Practical Nurse	47,854	54,219(a)	
Parts Marketing & Management	41,007	46,461(a)	
TOTAL 1978	173,444	196,513(a)	49,128(a)
FY-1979			
Respiratory Therapy Tech.	21,156	N/A	
Marketing & Merchandising I	49,413	N/A	
Air Cond., Refrig. & Heating	36,892	N/A	
Ag. Mach., Equip. Op. & Maint	70,897(b)	N/A	
Child Guid. & Care Ser. III&IV	50,257	N/A	
Nursing Assistant	41,009	N/A	
Industrial Electronics	43,818	N/A	
Banking Fundamentals	31,803	N/A	
TOTAL 1979	345,245	345,245	43,156(b)
TOTAL 1978 & 1979	—	541,758	45,147

(a) FY-1978 projects costs adjusted by 13.3 percent annual inflation to compare with 1979.

(b) The Agricultural Machinery project was atypical because it had a full-time staff member's salary included; excluding this project, the average 1979 project cost would be $39,193.

Table 3 presents these same twelve VIMAS projects grouped according to the following categories:

The Purchase Option - where the products of the project were purchased directly from identified sources without modifications;

The Adaptation Option - where a product acquired from a source was modified in some way, and then reproduced;

The Development Option - the products were developed in Florida and received a considerable amount of pre-reproduction work before being reproduced; and

The Miscellaneous Option - where purchase, adaptation, and/or development were used to acquire the products.

TABLE 3
Cost Comparison of Twelve Selected VIMAS Projects in Four Acquisition Categories, Adjusted for Inflation

Acquisition Option/Project Title	(1) Project Cost	(2) Adjusted Cost (a)	(3) Number of Teachers	(4) Cost/Teacher Per Project (b)	(5) Total Recipients (c)	(6) Cost/Recipient (d)	(7) Average Cost Per Teacher (e)	(8) Average Cost Per Recipient (f)	(9) Average Cost Per Project (g)
PURCHASE OPTION									
Child Guidance & Care Services	28,895	32,738	175	187	190	172	—	—	—
Respiratory Therapy Technician	21,156	21,156	18	1,175	38	557	—	—	—
Marketing & Merchandising I	49,413	49,413	384	129	404	122	—	—	—
SUB TOTAL	—	103,307	577	—	632	—	179	163	34,436
ADAPTATION OPTION									
Industrial Materials & Processes	55,688	63,095	160	394	290	218	—	—	—
A/C, Refrig., & Heating Mech.	36,892	36,892	216	171	345	107	—	—	—
SUB TOTAL	—	99,987	376	—	635	—	266	157	49,994
DEVELOPMENT OPTION (h)									
Practical Nurse	47,854	54,219	225	241	355	153	—	—	—
Parts Marketing & Management	41,007	46,461	8	5,808	138	337	—	—	—
Child Guid. & Care Srvc. III & IV	50,257	50,257	239	210	369	136	—	—	—
SUB TOTAL	—	150,937	472	—	862	—	320	175	50,312
MISCELLANEOUS OPTIONS									
Nursing Assistant	41,009	41,009	185	222	315	130	—	—	—
Industrial Electronics	43,818	43,818	205	214	335	131	—	—	—
Banking Fundamentals	31,803	31,803	34	935	164	194	—	—	—
Ag. Mach., Equip., Oper., & Maint.	70,897	70,897	181	391	311	228	—	—	—
SUB TOTAL	—	187,528	605	—	1,125	—	310	167	46,882

a- 1978 project costs were increased 13.3% to adjust for inflation for comparison with 1979 projects
b- column #2 divided by column 3.
c- 20 recipients added for purchase items; 120 recipients added for reproducted materials for statewide dissemination
d- column #2 divided by column #5
e- sub total per option column #2 divided by sub total column #3
f- sub total per option column #2 divided by sub total column #5
g- sub total per option column #2 divided by number of projects in that option category
h- the Development Option includes only projects with developed products and high reproduction preparation costs

It was originally hypothesized that the purchase option would be the least expensive method of acquiring materials, followed by adaptation and development. From the data in Table 3, we may infer that the purchase option is probably less expensive than the other two, but because of the different numbers of products and recipients involved, it is not possible to generalize beyond that.

In comparing the two models for the acquisition of vocational instructional materials, it was deemed helpful to compare the cost of the processes and the costs of the products in each model. For the purpose of this paper, process costs include all of the activities undertaken to bring a product to the point where the developers or instructional designers turn over the materials (or purchase recomendation) to those who will reproduce the final product (or purchase the product). Product costs include editing, graphics/art, paste-up, typesetting, proofing and reproduction and/or purchase costs.

In Table 4, we see a summary of the process and product costs for the five centralized development projects and the twelve VIMAS projects. The costs were adjusted for inflation to approximate 1979 dollar values. The average percentage of process costs (69.3%) in the five projects conducted using the centralized development, model was higher than the average percentage of process costs (58.1%) in the twelve VIMAS projects. Conversely, the average percentage (30.7%) of expended funds which went into the final products in the centralized projects was lower than the average percentage (41.9%) of funds going into products in the VIMAS projects. Strictly from the point of view of dollars expended and the proportions of expenditures which eventually went directly to education personnel in the form of useful products, the VIMAS model seems to be the more efficient of the two.

Table 5 details the costs of the twelve VIMAS projects adjusted for inflation, in seven categories. The reproduction and/or purchase of products had the highest average cost (27.7 percent) with the cost of the local agency grants next (26.3 percent) and

TABLE 4
A Comparison of Process and Produce Costs in Five Centralized Development Projects and Twelve VIMAS Projects, Adjusted for Inflation

Project Title	Total Adjusted Cost	Process Cost	% of Total	Product Cost (d)	% of Total
Pro-CESS	160,755(a)	65,829	40.95	94,926	59.05
G R O W	126,971(b)	92,587	72.92	34,384	27.08
Florida V-TECS Inservice Materials	128,838(b)	110,376	85.67	18,462	14.33
Nursery Operations	445,310(b)	310,826	69.80	134,484	30.20
Employability Skills	395,078(b)	291,686	73.83	103,392	26.17
Centralized Develop. Proj. SUB TOTALS	1,256,952	871,304	69.32	385,648	30.68
Child Guidance & Care Services	32,738(c)	29,549	90.26	3,189	9.74
Industrial Materials & Processes	63,095(c)	27,894	44.21	35,201	55.79
Practical Nurse	54,219(c)	29,913	55.17	24,306	44.83
Parts Marketing & Management	46,461(c)	24,852	53.49	21,609	46.51
Respiratory Therapy Technician	21,156	16,481	75.90	4,675	22.10
Marketing & Merchandising I	49,413	22,941	46.43	26,472	53.57
A/C, Heating & Refrig. Machanics	36,892	23,668	64.15	13,224	35.85
Ag. Mach. Equip., Oper. & Maint.	70,897	44,711	63.06	26,186	36.94
Nursing Assistant	41.009	29,519	71.98	11,490	28.02
Industrial Electronics	43,819	21,717	49.56	22,101	50.44
Banking Fundamentals	31,803	22,275	70.04	9,528	29.96
VIMAS Project SUB TOTALS	541,758	314,604	58.07	227,154	41.93

a- total cost adjusted 53.1 percent for inflation between 1974 and 1979
b- total cost adjusted 40.9 percent for inflation between 1975 and 1979
c- total cost adjusted 13.3 percent for inflation between 1978 and 1979
d- the product cost includes editing, graphic/art design, typesetting, paste-up and proofreading, where appropriate

TABLE 5
Total Inflation-Adjusted Cost and Percent of Cost of Twelve Selected VIMAS Project in Seven Cost Categories

Project Title	Total Adjusted Cost	Local Agency Grant (%) (b)	VIMAS Project Manager (%)	Materials Search Personnel (%)	Editors, Artist, Production (%) (c)	Other Personnel (%) (d)	Overhead (%) (e)	Reproduction Purchase (%)
Child Guidance & Care Service	32,738(a)	9,982	7,484	5,045	N/A	1,909	5,133	3,189
		(30.49)	(22.86)	(15.51)	N/A	(5.83)	(15.68)	(9.74)
Industrial Materials & Processes	63,045(a)	14,651	1,331	5,041	7,477	1,741	5,136	27,724
		(23.22)	(2.11)	(7.99)	(11.85)	(2.76)	(8.14)	(43.94)
Practical Nurse	54,219(a)	13,598	4,283	5,042	14,210	1,854	5,134	10,101
		(25.08)	(7.90)	(9.30)	(26.21)	(3.42)	(9.47)	(18.63)
Parts Marketing & Management	46,461(a)	9,956	2,978	5,046	13,766	1,742	5,134	7,842
		(21.43)	(6.41)	(10.86)	(29.63)	(3.75)	(11.05)	(16.88)
Respiratory Therapy Tech.	21,156	3,434	2,108	5,306	490	1,364	4,197	4,185
		(16.23)	(10.30)	(25.08)	(2.32)	(6.45)	(19.84)	(19.78)
Marketing & Merchandising I	49,413	10,935	1,338	5,306	N/A	1,164	4,197	26,472
		(22.13)	(2.71)	(10.74)	N/A	(2.36)	(8.49)	(53.57)
A/C, Heating & Refrig.	36,892	8,575	4,106	5,306	3,928	1,464	4,197	9,316
		(23.24)	(11.13)	(14.38)	(10.65)	(3.97)	(11.38)	(25.25)
Ag. Mach., Equip., Oper., & Main	70,897	32,300	1,645	5,306	9,232	1,264	4,197	16,954
		(45.56)	(2.32)	(7.48)	(13.02)	(1.78)	(5.92)	(23.91)
Child Guid. & Care III & IV	50,257	8,445	1,823	5,306	12,315	1,314	4,197	16,857
		(16.80)	(3.63)	(10.56)	(24.15)	(2.62)	(8.35)	(33.54)
Nursing Assistant	41,009	14,000	4,652	5,306	6,030	1,364	4,197	5,460
		(34.14)	(11.34)	(12.94)	(14.70)	(3.33)	(10.23)	(13.31)
Industrial Electronics	43,818	7,799	3,051	5,306	3,658	1,364	4,197	18,443
		(17.80)	(6.96)	(12.11)	(8.35)	(3.11)	(9.58)	(42.09)
Banking Fundamentals	31,803	8,719	2,789	5,306	5,927	1,264	4,197	3,601
		(27.42)	(8.77)	(16.68)	(18.64)	(3.97)	(13.20)	(11.32)
TOTALS/AVERAGES	541,758	142,394	37,588	62,622	77,033	17,808	53,113	150,144
		(26.28)	(6.94)	(11.56)	(14.22)	(3.29)	(9.99)	(27.71)

a- The costs of the 1978 projects were increased by 13.3 percent for inflation to compare with FY-1979 projects.
b- Local agency grants include funds for review/select, development/adaptation where appropriate.
c- Production includes proofreading, typesetting and paste-up.
d- Other Personnel includes graduate students and subject matter experts.
e- Overhead includes rent, shipping, communications, office copying/duplication, equipment rental, travel, computer costs, sample materials, and office supplies.

followed by costs of editors, artists and production personnel (14.2 percent); the search personnel (11.6 percent); overhead, which includes a wide variety of project-related costs (10.0 percent); the VIMAS Project Managers' cost (6.9 percent); and the lowest average percentage, the cost of other personnel (3.3 percent). It is interesting to note that the first three highest categories are for expenditures which went directly to local agencies in the form of grant monies or products (including the editing, art, and preparation for reproduction) and added up to more than two-thirds (68.21 percent) of the project money expended.

One of the assumptions of the VIMAS project was that avoiding the a priori decision to develop instructional materials would be less expensive than other options, if suitable instructional materials could be acquired from outside sources. It was also assumed that the difference in costs would be sufficient to justify the increased expenditures in searching for materials, reviewing and selecting the best, and adapting materials that required it. Table 6 illustrates the process costs incurred by VIMAS (adjusted for inflation to 1979 levels) and the estimated process costs (also adjusted for inflation) reported by the outside sources which originally developed the materials acquired in the selected projects. In the ten VIMAS projects shown (no data were available for two projects) a total of 43 products were acquired from outside sources. The original developers reported process costs for 33 of the 43 products. The total process costs for VIMAS for 43 products in these ten projects was $261,858, or approximately 9.3 percent of the $2,827,685 original developers estimated it cost them to produce the 33 products. A very rough estimate of the costs of the remaining 10 products from original developers might be made by assuming that process costs for these products were the same as for the others, and adding approximately 30 percent to the amount spent in the original development, giving an estimated total process cost for 43 products of $3,684,559 to the original developers. The VIMAS process costs of $261,858 is 7.1 percent of the rough estimate ($3,684,559) of the process costs for all 43 acquired products.

TABLE 6

A Comparison of Ten Selected VIMAS Process Costs and the Process Cost of Acquired VIMAS Products to Original Developers, Adjusted for Inflation.

Project Title	VIMAS Process Costs	Number of Products Acquired From Outside Sources	Number of Products Included In Adjusted Orig. Development Cost	Adjusted Original Development Cost (b)
Child Guidance & Care Services	29,549(a)	1	1	85,521
Practical Nurse	29,913(a)	1	1	267,800
Respiratory Therapy Technician	16,481	1	1	60,255
Market & Merch. I	22,941	6	6	212,650
A/C & Heat. Ref. Mech	23,668	1	1	102,732
Ag. Mach. Equip. Maint	44,711	15	14	1,628,994
Child Guidance & Care Service III&IV	21,084	3	2	259,012
Nursing Assistant	29,519	5	2	43,485
Indust. Electronics	21,717	3	2	124,259
Banking Fundamentals	22,275	7	3	42,977
TOTALS	261,858	43	33	2,827,685(c)

(a) 1978 VIMAS process costs were increased 13.3 percent for inflation to compare with FY-1979 projects.

(b) Process costs reported by original developers were increased for inflaction to equal 1979 dollars, according to the years products were developed and rates shown in Attachment-A.

(c) This total represents costs for 33 of the 43 products acquired from outside sources. By increasing this total by approximately 30 percent to account for the ten products where no cost data were available, we can make a rough estimate of total process costs for original developers for all 43 products of approximately $3,684,559.

IV. SUMMARY AND CONCLUSION

A cost comparison of five centralized development and twelve multi-option projects of the Vocational Instructional Materials Acquisition System (VIMAS) was conducted. All costs were adjusted for inflation to 1979 levels. The findings of the study were as follows:

1. The average total costs for the centralized development projects was $251,390 while the average costs of the VIMAS projects was 18 percent of that, or $45,147.
2. The average cost of VIMAS projects which utilized the purchase option ($34,436) was less than the average cost of adaptation projects ($49,994) development projects ($50,312) or projects which used a combination of the three options ($46,882). However, because of the different numbers of products and recipients involved in each project, it was not possible to generalize beyond saying that the purchase option is probably less expensive than the other VIMAS acquisition options.
3. The average percentage of process costs (the process of acquiring the materials) was higher in the centralized, development projects (69.3%) than in the VIMAS projects (58.1%). Conversely, a lower percentage of funds went into the products in the centralized, development projects (30.7%) than in VIMAS projects (41.9%).
4. The highest average percentage of costs in VIMAS projects went to the reproduction and/or purchase of products (27.7%), followed by local agency grants (26.3%); editors, artists, and production personnel (14.2%); search personnel (11.6%); overhead (10.0%); VIMAS Project Managers' cost (6.9%); and other personnel (3.3%).

5. The original developers reported costs of $2,827,685 to produce 33 of a total 43 products, which VIMAS acquired for process costs of $261,858. Extrapolating for missing cost data for 10 remaining products, a gross estimate was made of $3,684,559 in developmental (process) costs to original developers for 43 products, and $261,858 or 7.1 percent of the process costs to Florida for acquiring these materials using VIMAS procedures.

The overall conclusion to be drawn from the study was that VIMAS procedures are less expensive than the systematic development procedures used in the five centralized projects. It also indicates that the multi-option model is more efficient than the centralized development model, in terms of reducing the percentage of process costs and increasing the percentage of funds going to local agencies in grants and products.

These cost reductions have made it possible for DVE to increase the number of projects DVE can support simultaneously, from four to more than ten per year. In the 42 priority projects implemented through VIMAS in four years, more than 360 separate curricular or instructional products have been acquired from more than 76 different agencies.

Although the quantity of products has been increased, the average time required reduced, and cost efficiencies found, this has not been accomplished without some reductions in the comprehensiveness and continuity of the instructional materials (Massey & Kromhout, 1981). The Division of Vocational Education has accepted this trade-off as a progmatic compromise to increase the impact of its scarce resources for assisting local agencies acquire competency-based instructional materials.

The general nature of the problem of scarce resources for acquiring instructional materials should make the VIMAS multi-option model and the conclusions of this study of interest to educators on local, state, and the national level.

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Attachment A - **INFLATION INDEX**

The following data on flation were quoted by personnel of the Florida Department of Commerce from the Consumer Price Index (CPI) for all urban consumers, for all items. These data were, in turn, obtained from the U.S. Department of Labor, Bureau of Labor Statistics' "Monthly Update."

YEAR	AVERAGE YEARLY PERCENTAGE CPI INFLATION RATE
1969	6.1
1970	5.5
1971	3.4
1972	3.4
1973	8.8
1974	12.2
1975	7.0
1976	4.8
1977	6.8
1978	9.0
1979	13.3

Attachment B - **COST STUDY CATEGORY DEFINITIONS**

PROJECT TITLE _____ **YEAR(S)**_____

LEA GRANT: **GRANT** net amount granted to local $_____
Education Agency (minus returned funds and local purchase/printing)
ADDENDUM $_____

CARRY-OVER FUNDS (FY-) $_____
Funds provided through the previous year's grant and used in project
CSVE PERSONNEL: **PROJECT MANAGER**- percent of time $_____
for all Project Managers; multiplied by salary + fringe; times year(s)
FEIS PERSONNEL-total FEIS salar- $_____
ies and fringe, divided by no. of projects/FY = average cost/FY
CSVE PRODUCTION (NOT IN PROMO) $_____
Editors, Visual Designers; Production Manager salaries + fringe; each project rated high, medium, low production; 3 categories assigned % of total dollars $_____
OTHER PERSONNEL
graduate students + secretary, divided by no. of projects; add consultants/appro. project
CSVE OVERHEAD COSTS: **VIMAS STAFF OVERHEAD** $_____
travel, room rent, equipment rental, communication/shipping, quick printing, copying, computer, telephone, supplies, equipment purchase, indirect costs $_____
average/project
FEIS STAFF OVERHEAD
same categories; sample materials for review/select meetings; average per project
REPRODUCTION: **REPRODUCTION OF ALL PRODUCTS** $_____
actual cost of reproduction, including final proofing, paste-up; includes cost of bibliographies, where appropriate.
PURCHASE: **PURCHASE OF ALL PRODUCTS** $_____
actual costs of purchase, excluding sample materials for review/select meetings

SUB-TOTAL PROJECT COSTS $_____

ADMINISTRATIVE DEVELOPMENT COST FOR VIMAS:
VIMAS SYSTEM DEVELOPMENT $_____
N.A. for projects studied
OTHER VIMAS FUNDED ACTIVITIES $_____
N.A.

TOTAL PROJECT/VIMAS COSTS $_____

COMMENTS: footnotes explaining addenda, carry-over funds, and use of funds, as as we; as reference where additional documentation can be found.

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